**History: Case Study**

Big Ideas

Technological applications that affect biological processes and cellular functions are used in the pharmaceutical and medical industries.

Biological molecules and their chemical properties affect cellular processes and biochemical reactions.

Biochemical compounds play important structural and functional roles in cells of all living

organisms.

Overall Expectations

By the end of this course, students will:

B1. Evaluate technological advances in the field of cellular biology;

B2. Investigate the chemical structures, functions, and chemical properties of biological

molecules involved in some common cellular processes and biochemical reactions;

B3. Demonstrate an understanding of the structures and functions of biological molecules, and the biochemical reactions required to maintain normal cellular function.

Specific Expectations

B1.2 evaluate, on the basis of research, some advances in cellular biology and related technological applications

B3.2 describe the structure of important biochemical compounds, including carbohydrates, proteins, lipids, and nucleic acids, and explain their function within cells

**History: Case Study**

**Introduction:**

DNA discovery has many controversies surrounding it, in terms of who discovered it. The two main individuals that are always given credit for the discovery of DNA are Watson and Crick. Yet, there are other players that guided Watson and Cricks research and it is important for the students to be able to understand and know all aspects surrounding this issue. This research assignment on History of DNA discovery allows students to explore this issue. This research will be helpful to students as they might be looking forward to a career in Science or as a Scientist. As a Scientist you may come across these issues yourself and how it is important to give credit where needed and how to protect one’s own findings. Students also gain an understanding of the structure of DNA and nucleic acids and various methods being used to determine it.

**Implementation:**

This assignment will be introduced first by and In-class activity.

**Part 1: History – Watson and Crick Paper**, is to be done in class. Students will be provided the Watson and Crick article from 1953, where the authors introduce the structure of DNA based on their findings. After reading this article the students will answer a few questions given to them in groups of three. This will be done on a Chart paper. Teacher will debrief at the end and each group will let the whole class know of what they came up with.

**Materials:** Copies of the article, Chart Paper, Coloured markers to write on chart paper with, masking tape

This will be an activity that will be done to introduce the History comic strip project to the students. This Activity follows the lesson on DNA structure as seen in Unit-plan. This way student is able to comprehend article better.

**Part 2: History – Comic Strip**, is an assignment which will be given to the students after they have done the In-class activity. Students will again work in groups of three, which will be assigned by the teacher. Students will be required to come up with a comic strip to address the issue surrounding Discovery of DNA. This will make students more aware of scientific research and its publication. Students will also gain an understanding of how to carry out research and how to creatively design a comic strip. This will enhance their understanding of the structure of DNA. Students will learn and develop skills such as communication, team work, analysis, critical thinking.

**Materials:** students can bring materials from home to work on the project. Teacher can provide some materials such as markers, etc. This will depend on whether the students are drawing it by hand or making it on computer. Students can come to teacher for help if certain materials are out of their reach due to various different reasons. In this case, the teacher will make arrangements for them.

The students will be provided class time to work on the assignment and lessons on researching and referencing will be provided.

**History: Watson and Crick Paper (Part 1)**

**“Molecular Structure of Nucleic Acid: A structure for Deoxyribose Nucleic Acid”**

1. Read the article by Watson and Crick on DNA structure.

2. List the main points of the article and write a summary on it.

3. On a Chart paper present the summary or points in creative manner. (Use of Diagrams, point form notes, caricatures, etc.)

4. In group discuss how the discovery can benefit us. Why it is important? How has it affected world and our day to day life.

5. On the Chart Paper write out points from group discussion.

6. Present to whole class your points and discussion questions.

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**History: Cartoon Strip (Part II)**

**“Molecular Structure of Nucleic Acid: A structure for Deoxyribose Nucleic Acid”**

**Introduction:** Modern day breakthrough and advancement in Science leading to better life in today’s world are only possible due inventions, innovations, and research findings from past Scientists'. In this Unit of Biochemistry you have learned about different marcomolecules and how they join and polymarise to make biological molecules, which have specific functions and properties. DNA is a macromolecule. DNA is vital! The discovery of molecular structure of DNA is very important as DNA is blueprint of life. DNA is very important in the field of medicine, agriculture, etc. DNA is basis of life. There are no doubts in terms of controversies surrounding the discovery of DNA Double Helix. We have read the article published by Watson and Crick, in which they have polished their findings on double helical structure of DNA and how bases pair with each other in DNA.

**Assignment/Scenario:** You are a comic strip writer at Science Today and work with two other comic strip writers to produce daily comic strips for Science Today. You are given the task of creating a one page fullscape (11 by 17) comic story regarding the controversy around the Discovery of DNA. Science Today is mostly read by Scientists and students in the Science field. Your target is to also try and get high school students taking Science courses to read this particular media. You are required to conduct research and compile the data around the controversy. Your research sources have to be valid (scholarly articles and peer reviewed journals) and you are to identify key players in the controversy (this may include, society, individuals, scientific facts, other factors) and design a cartoon representation of it. Your cartoon representation has to be based on research and should be interesting and grab audience's attention. You may creatively design the environment and other areas of the cartoon strip based on your judgement. The assignment will be graded on a rubric. You have to fill out and submit a copy of self-evaluation provided.

**For this assignment you:**

**Must,**

* Have six scholarly articles referenced
* Design each character and give them a unique style
* Creatively design the script
* Address the issue of DNA Controversy
* Have all important characters that play a role in the issue
* Cover all concepts, key terms and terminology surrounding the topic and issue

**Should,**

* Include as many characters as needed to get your point across
* Use imagination in designing the script and strip

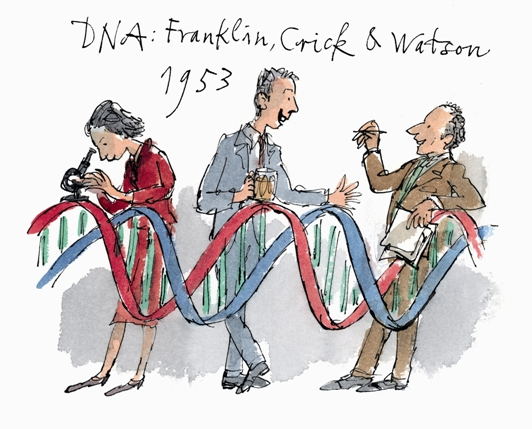
**Could,**

* Design the script by drawing or painting or use software and come up with a multimedia type script

**Exemplar:**

This is not the perfect example but it is to help you get your creative juices flowing.



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**Rubric: History: Cartoon Strip (Part II)**

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| --- | --- | --- | --- | --- |
| Research/  Content | - One to two scholarly journals or articles are referenced  - Very few concepts, terms, issues and other relevant information for public awareness provided.  - Reference list is not sited in APA format | - Three to four scholarly journals or articles are referenced.  - Some key concepts, terms, issues and other relevant information for public awareness provided.  - Reference list is not properly sited in APA format | - Four to Five scholarly journals or articles are referenced  - Almost all to most of key concepts terms, issues and other relevant information for public awareness is provided  - Reference list is properly sited in APA format | - Six or more scholarly journals or articles are referenced  - All key concepts, terms , issues and other relevant information for public awareness provided  - Reference list is properly sited in APA format |
| Character design | - None to a few characters are well developed and designed in a creative manner  - Each character does not have a unique style that is reflected in the comic strip | - Few to some characters are well developed and designed in a creative manner  - Few to some characters have their unique style which is reflected in the comic strip | - Most Characters are well developed and designed in creative manner  - Each Character has their unique style which is reflected in the comic strip | - All Characters are well developed and designed in creative manner  - Each character has their unique style, which is reflected in the comic strip |
| Comic Script/Story | - Script is not well written and lacks originality  - Script does not demonstrate student understanding of issues and concepts  - Script lacks creativity | - Script is moderately well written and shows originality  - Script is unable to show understanding of most of the issues and concepts  - Script lacks creativity | - Script is well written and shows originality  - Script shows understanding of most the issues and concepts  - Script is creative | - Script is well developed and is well written  - Script shows excellent understanding of all the issue and concepts  -Script is creative and uses imagination where applicable |
| Comic Strip/Story- Visual Presentation | - Language is not appropriate for the issue that is being addressed  - Comic strip (Visual) is not designed creatively | - Language is somewhat appropriate for the issue that is being addressed  - Design of the comic strip (visual) lacks creativity | - Appropriate language is used to address the situation  - There is some creativity in the design (Visual) of the comic strip | - Use of language is appropriate to the situation and design of the strip  - Comic panels/design (Visual) is well drawn and comic conventions are closely followed |

**Self-Evaluation: History: Cartoon Strip (Part II)**

Q1. How did you contribute in this assignment? (Unique contribution)

Q2. Which team work/collaborative learning skills did you develop and need to improve on?

Q3. What did you like about the assignment?

Q4. How much part of the assignment was done by you in your group (out of 100%)